KALA LABORATORIES
2979 Ualena Street
Honolulu, Hawaii 96819
ELECTRONICS OF HAWAII, INC.
2979 UALENA STREET
HONOLULU, HAWAII

NAVAER 16-30USM54-501

Handbook

Operation and Service Instructions

WAVEMETER AN/USM-54

KALA LABORATORIES
2979 Ualena Street
Honolulu, Hawaii 96819

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PUBLISHED BY DIRECTION OF THE CHIEF OF THE BUREAU OF AERONAUTICS

15 OCTOBER 1956

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TABLE OF CONTENTS

Section		Page
I	INTRODUCTION AND DESCRIPTION	1
	1-1. Purpose	1
	1-3. Capabilities and Limitations	1
	1-6. General Description	1
	1-9. Simplified Principles of Operation	2
	1-12. General Characteristics	2
	1-15. Functional Description	3
	1-20. Accessory Equipment	4
II	SPECIAL SERVICE TOOLS	5
	2-1. Special Service Tools	5
III	PREPARATION FOR USE OR STORAGE	5
	3-1. Preparation for Use	5
	3-3. Preparation for Storage	5
IV	OPERATION INSTRUCTIONS	5
	4-1. Connecting the Test Set and Equipment Being Tested	5
	4-4. Operating Controls and Indicators	6
	4-6. Starting the Equipment	7
	4-8. Normal Sequence of Operation	7
	4-16. Precautions	9
V	PERIODIC INSPECTION, MAINTENANCE, AND LUBRICATION	10
	5-1. Regularly Required Inspections	10
	5-3. Lubrication	10
VI	TROUBLE SHOOTING	10
	6-1. Trouble Shooting Chart	10

TABLE OF CONTENTS (cont)

Section		*Page*
VII	CALIBRATION	14
	7-1. Calibration	14
VIII	INTRODUCTION TO ILLUSTRATED PARTS BREAKDOWN	15
IX	GROUP ASSEMBLY PARTS LIST	19
X	NUMERICAL INDEX	26
XI	REFERENCE DESIGNATION INDEX	29

LIST OF ILLUSTRATIONS

Figure		*Page*
1-1	Wavemeter AN/USM-54	iv
1-2	Wavemeter AN/USM-54, Schematic Diagram	3
4-1	Operating Controls, Indicators, and Connectors	8
9-1	Wavemeter AN/USN-54, Exploded View	20
9-2	Wavemeter Panel Assembly	22

LIST OF TABLES

Table		*Page*
4-1	Operating Controls and Indicators	6
6-1	Trouble Shooting Chart	11

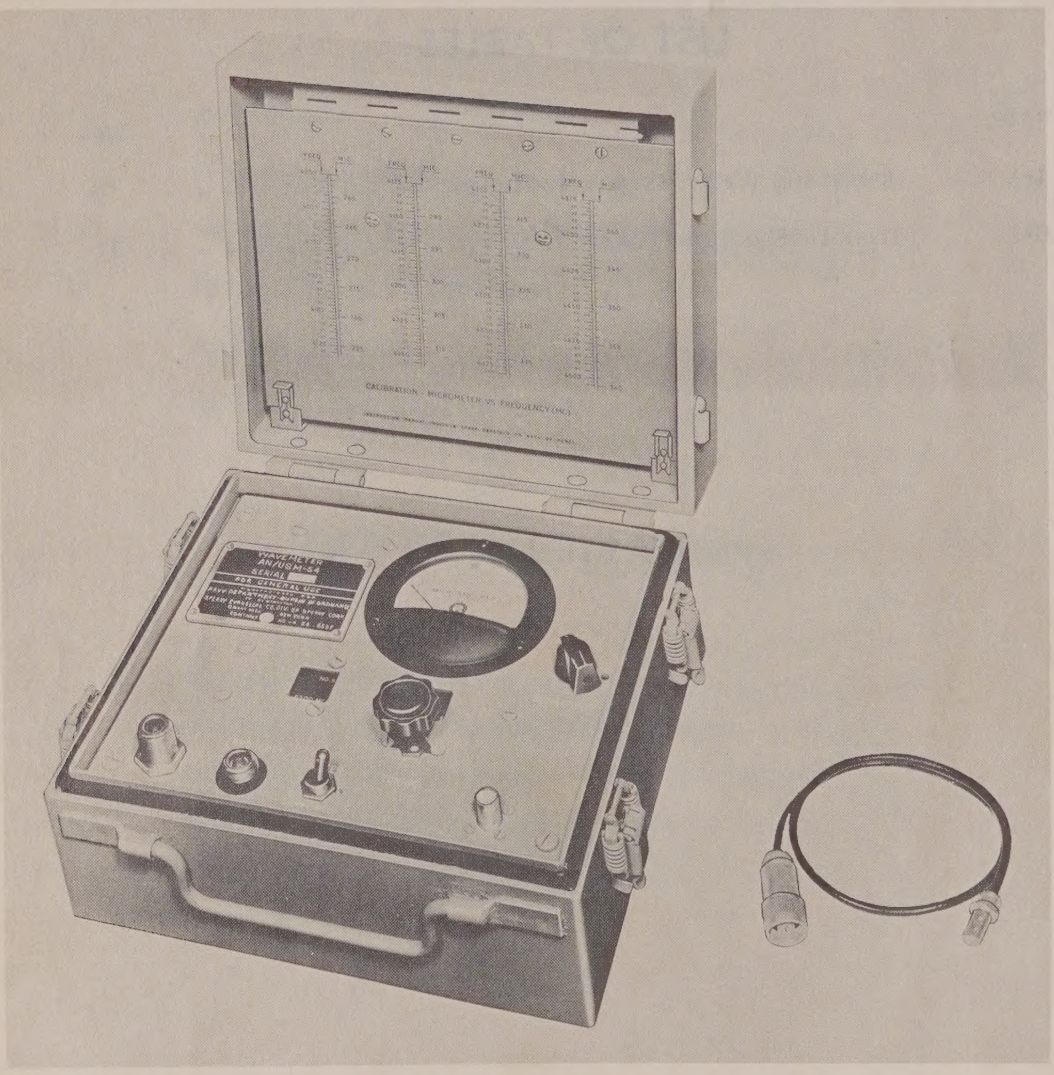


Figure I-1. Wavemeter AN/USM-54

SECTION I
INTRODUCTION AND DESCRIPTION

1-1. PURPOSE.

1-2. The Wavemeter AN/USM-54, which is designated by Sperry Gyroscope Company as Model 537 Frequency Meter, is a compact light-weight test set designed to make frequency measurements in the range from 3500 to 6500 mc, and to indicate the presence of r-f energy. Wavemeter AN/USM-54 is composed of Wavemeter FR-95/USM-54 and Radio Frequency Cable Assembly CG-1372/U (2'1").

1-3. CAPABILITIES AND LIMITATIONS.

1-4. The test set is a complete unit which will measure frequency with an accuracy of 0.1 per cent within the frequency range of 3500 to 6500 mc. Furthermore the test set may be coupled directly to a transmission line carrying energy to obtain a rough indication of frequency. An auxiliary circuit of the test set provides an indication of the presence of r-f energy being introduced into the test set. The instrument also provides an output which may be coupled to an oscilloscope for resonance indications.

1-5. For measurements of maximum accuracy it is necessary to decouple the test set from the signal source. In the absence of decoupling the rapid change of impedance near resonance will reflect back to the oscillator and may cause a frequency shift. It is important that sufficient decoupling be used to prevent damage to the crystal rectifiers in the unit. Use of the auxiliary circuit for detection of the presence of r-f energy requires that a d-c path for crystal current be provided within the equipment being tested.

1-6. GENERAL DESCRIPTION.

1-7. The test set is constructed on an aluminum panel which serves both as a front panel and a support. On the face of the panel are all three operating controls, three connectors, and the face of a microammeter.

On the rear of the panel are a coaxial frequency meter and the various other components which comprise the circuitry of the test set.

1-8. The panel with the mounted components is housed in a protective box assembly 9-1/2 inches wide by 10-1/4 inches long by 5-3/4 inches deep overall. The box encloses the rear of the panel and is attached to the panel by four screws. The box includes a cover which is hinged to the box and fastened closed by four spring loaded catches. Within the cover is a selected-range calibrated conversion chart, space for a handbook of instructions, and accessory cable. Spare crystals are mounted on the rear of the panel. A serialized conversion chart of the entire frequency range of the coaxial frequency meter is included in plastic envelopes bound into the handbook when the handbook is attached to a test set.

NOTE

The conversion chart in the handbook is valid only for the frequency meter to which it is associated. Loss or destruction of the chart renders the frequency meter inaccurate or unusable until a new chart is supplied.

1-9. SIMPLIFIED PRINCIPLES OF OPERATION.

1-10. R-f signals are introduced into a coaxial frequency meter. When the frequency meter is tuned to resonance, the r-f energy is coupled through the frequency meter, rectified by a crystal, and applied to a microammeter. The microammeter reading is maximum at resonance.

1-11. Within the test set is another crystal rectifier, but this one receives energy coupled from any microwave source directly to the crystal. A microammeter reading merely indicates the presence of r-f energy.

1-12. GENERAL CHARACTERISTICS.

1-13. General characteristics of the test set are transmission resonance indications or microwave oscillation detection. The characteristics allow frequency measurement of both c-w and modulated signals. The test set has a loaded Q of 400 and an input impedance of 50 ohms. Input connectors unite with UG-21 B/U or equivalent Type N connectors.

1-14. FUNCTIONAL DESCRIPTION. (See figure 1-2.)

1-15. R-f signals introduced in "FREQUENCY" connector J101 are fed into coaxial frequency meter assembly Z101. The coaxial frequency meter consists of a length of rigid coaxial line in which the inner conductor

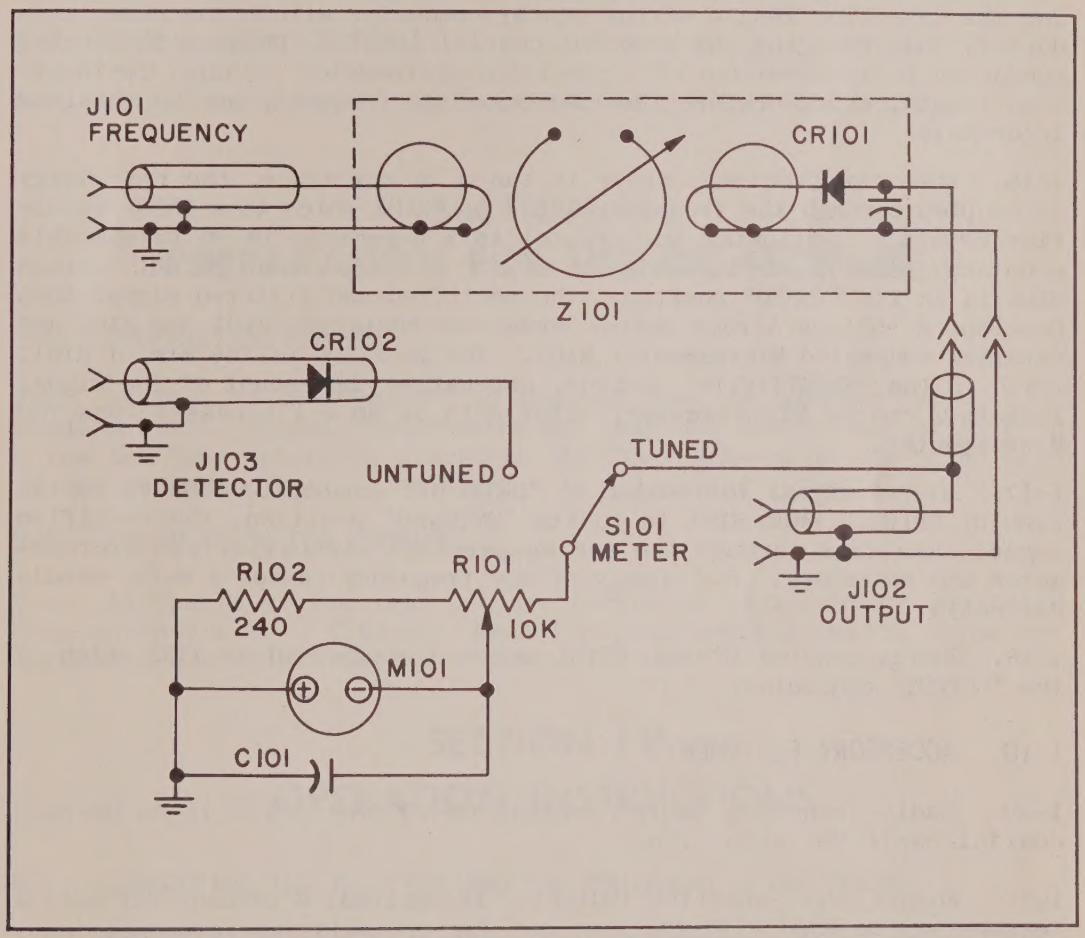


Figure 1-2. Wavemeter AN/USM-54, Schematic Diagram

extends only part of the length. Where the line has no inner conductor it acts as circular waveguide operating below cutoff and appears as an open circuit. The other end of the coaxial line is terminated by a shorting quarterwave trap. The center conductor of the coaxial line projects through the shorting face of the quarterwave trap but does not actually contact the trap at any point. Tuning is accomplished by varying the insertion length of the center conductor within the outer conductor, thus changing the resonant coaxial length. Because the center conductor is an extension of a precision micrommeter spindle, the insertion length, and therefore the corresponding frequency may be obtained accurately.

1-16. When the frequency meter is tuned to resonance, the r-f energy is coupled through the frequency meter to CR101 which is a 1N23B rectifier crystal. Following the crystal is a capacitor in an inseparable mounting. The capacitor acts as an r-f filter. When "METER" switch S101 is in its "TUNED" position, the rectified and filtered signal then develops a voltage across series connected resistors R101 and R102 and parallel connected Microammeter M101. The position of the arm of R101, which is the "SENSITIVITY" control, determines the amount of the signal impressed on the Microammeter. C101 acts as an r-f bypass across the Microammeter.

1-17. An r-f signal introduced at "DETECTOR" connector J103 is rectified by CR102. When S101 is in its "UNTUNED" position, the rectified signal then goes through the series-parallel circuit of the Microammeter and resistors. R-f energy of any frequency causes a meter-needle deflection.

1-18. Energy coupled through CR101 passes through P101 to J102 which is the "OUTPUT" connector.

1-19. ACCESSORY EQUIPMENT.

1-20. Radio Frequency Cable Assembly CG-1372/U (2'1") is an RG-58/U coaxial cable 25 inches long.

1-21. When a more sensitive indicator is desired, a cathode ray oscilloscope may be used with the test set for transmission resonance indications, as well as for detection of oscillations.

SECTION II
SPECIAL SERVICE TOOLS

2-1. SPECIAL SERVICE TOOLS.

2-2. No special service tools are required for this test set.

SECTION III
PREPARATION FOR USE OR STORAGE

3-1. PREPARATION FOR USE

3-2. As soon as the test set is removed from its packing crate it is ready for use. Space requirements are only one square foot of area to allow the test set to be placed on the four bumpers on the broad side of the protective box.

3-3. PREPARATION FOR STORAGE.

3-4. All parts of the test set are corrosion resistant or protected from corrosion by a finish. Therefore, no special instructions are necessary for this test set.

SECTION IV
OPERATION INSTRUCTIONS

4-1. CONNECTING THE TEST SET AND THE EQUIPMENT BEING TESTED.

4-2. To measure frequency, connect cable assembly CG-1372/U to the "FREQUENCY" connector which is a UG-27B/U type. Connect the other end of

the cable to the r-f source being tested. If accurate frequency measurements are to be made, introduce a 15- to 20-db attenuator between the signal source and the test set. If there is a directional coupler in the transmission line of the equipment being tested, connect the cable assembly to the directional coupler.

4-3. To test for r-f power, connect cable assembly CG-1372/U to "DETECTOR", a Type N connector. Connect the other end of the cable to the equipment to be tested. This external equipment must provide a d-c return path for crystal current in the test set.

4-4. OPERATING CONTROLS AND INDICATORS (See figure 4-1).

4-5. Table 4-1 shows the purpose and use of all operating controls and the purpose, use, and interpretation of all indicating instruments.

TABLE 4-1

OPERATING CONTROLS AND INDICATORS

Name	*Figure 4-1 Index No.*	*Purpose*	*Settings and Functional Indications*
SENSITIVITY	2	Control Microammeter deflection for a constant r-f signal input.	Minimum gain or fully counterclockwise provides minimum Microammeter deflection. Maximum gain or fully clockwise provides maximum Microammeter deflection
TUNING	4	Vary the insertion of the center conductor of the frequency meter.	Fully clockwise is representative of minimum frequency. Fully counterclockwise is representative of maximum frequency.

TABLE 4-1 (cont)

OPERATING CONTROLS AND INDICATORS

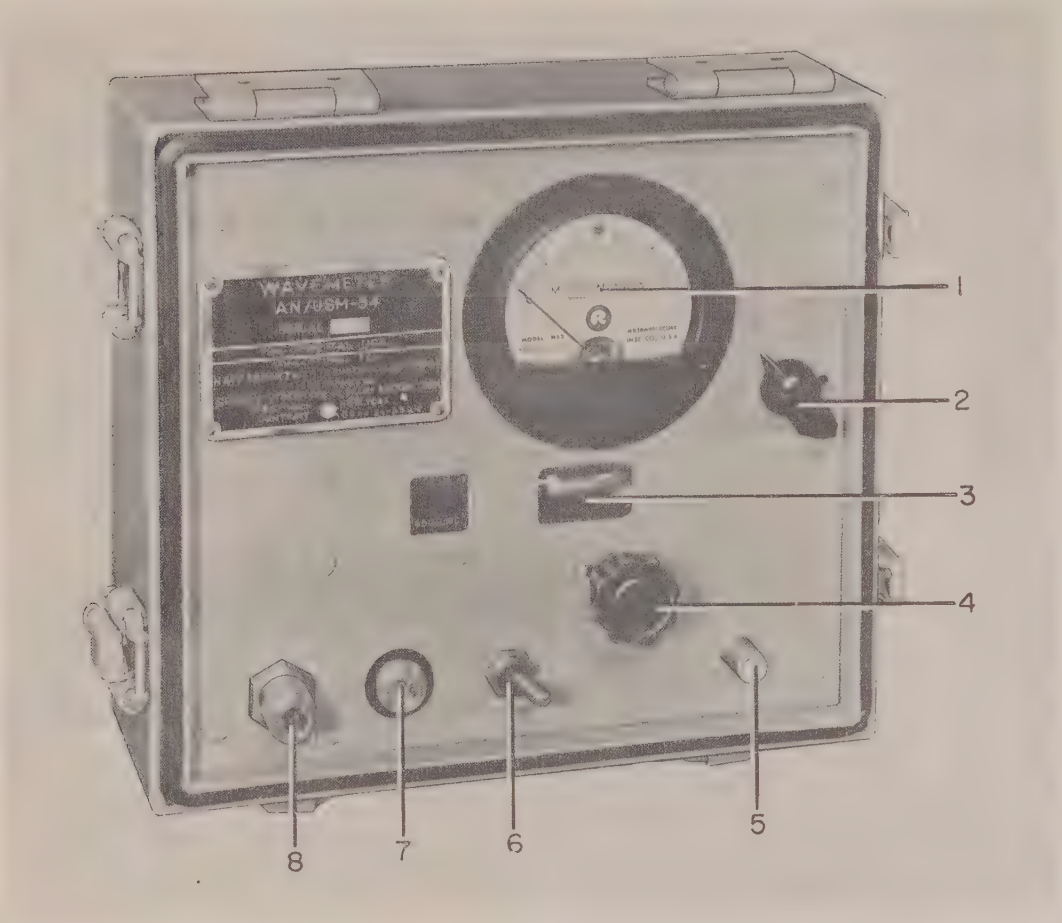
Name	*Figure 4-1 Index No.*	*Purpose*	*Settings and Functional Indications*
METER	6	Change the Micro-ammeter input.	TUNED POSITION - Micro-ammeter input is from the frequency meter crystal. UNTUNED POSITION - Micro-ammeter input is from the detector crystal.
Microammeter	1	Indicate resonance in the frequency meter. Indicate r-f energy in the detector.	A peak reading on the Microammeter indicates resonance. Any Microammeter deflection indicates the presence of r-f energy.
Vernier	3	Indicates the insertion of the center conductor.	The microammeter reading is compared to the corresponding frequency reading as plotted on the calibration chart inside the cover.

4-6. STARTING THE EQUIPMENT.

4-7. There is no starting procedure for the test set. The test-set functions will begin with the introduction of r-f energy from the equipment under test.

4-8. NORMAL SEQUENCE OF OPERATION.

4-9. **TESTING FOR R-F ENERGY.** Turn the "SENSITIVITY" control knob (2, figure 4-1) to the minimum gain position. Place "METER", switch (6)



1. Microammeter
2. "SENSITIVITY" knob
3. Vernier indicator
4. "TUNING" knob
5. "OUTPUT" connector
6. "METER" switch
7. "FREQUENCY" connector
8. "DETECTOR" connector

Figure 4-1. Operating Controls, Indicators and Connectors

in the "UNTUNED" position. Connect the cable assembly to "DETECTOR" connector (8). Then connect the cable to the equipment being tested, and energize it. Adjust the "SENSITIVITY" control knob until the Microammeter needle (1) is deflected to the right indicating the presence of r-f energy. An indication can only be obtained if the equipment being tested completes a d-c path for the crystal current in the test set.

4-10. MEASURING FREQUENCY.

4-11. Turn the "SENSITIVITY" control knob (2, figure 4-1) to the minimum gain position. Place the "METER" switch (6) in the "TUNED" position. Connect the cable assembly to the "FREQUENCY" connector (7).

4-12. For rough frequency measurements connect the cable assembly directly to the r-f signal source. Adjust the "TUNING" control knob (4, figure 4-1) until there is a deflection of the needle on the indicating Microammeter (1). Turn the "SENSITIVITY" control knob (2) counterclockwise slightly, and then continue adjusting the "TUNING" control knob until a peak is indicated. Use the "SENSITIVITY" control knob to prevent overloading of the Microammeter. Convert the Vernier (3) reading to frequency by using the calibration chart.

4-13. For accurate frequency measurements connect the cable assembly through a 15- to 20-db attenuator or a 15- to 20-db directional coupler. Knowing the rough frequency and the corresponding Vernier (3, figure 4-1) reading, adjust the "TUNING" control knob (4) until the Vernier reading is approximately the same as for the rough frequency. Turn "SENSITIVITY" control knob (2) until the Microammeter (1) needle is deflected approximately half-scale. Slowly turn the "TUNING" control knob to maximize the needle deflection. Use the "SENSITIVITY" control knob to prevent overloading the Microammeter. When the needle deflection is maximum, note the Vernier reading and convert to frequency using the calibration chart. For more accurate indications connect an oscilloscope to "OUTPUT" connector (5) and attain a maximum deflection of the trace.

4-14. PRECAUTIONS.

4-15. When using the test set, do not confuse main and side band frequencies of modulated signals. Modulated signals will display responses at both main and sideband frequencies. Improper square wave modulation

may result in oscillation at two frequencies both of which will cause responses. Adjusting either the oscillator or modulator of the r-f source will eliminate the second mode. Furthermore, a frequency at an odd multiple of the meter indicated frequency will produce resonance and cause a Microammeter deflection.

4-16. When using the test set with a high power r-f source, use care in applying power on the crystal. The crystal will withstand only limited power levels of r-f energy. With the exception of oscillators putting out only a few milliwatts of power, connection should be made through a directional coupler or attenuator.

SECTION V
PERIODIC INSPECTION, MAINTENANCE, AND LUBRICATION

5-1. REGULARLY REQUIRED INSPECTIONS.

5-2. Every quarter, check that the "SENSITIVITY" control knob and the "TUNING" control knob are tight on the control shaft. Also, quarterly, check that the cable connectors are free of nicks and burrs and the cables are not frayed or kinked.

5-3. LUBRICATION.

5-4. No lubrication is required. The threads of the micrometer are protected by Dow Corning Compound No. 4.

SECTION VI
TROUBLE SHOOTING

6-1. TROUBLE SHOOTING CHART.

6-2. A trouble shooting guide is included in table 6-1.

TABLE 6-I

TROUBLE SHOOTING CHART

Trouble	*Probable Cause*	*Remedy*
No Microammeter indication in "TUNED" position of "METER" switch	Crystal (5, figure 9-2) CR101 burned out.	1. Unscrew knurled coupling ring holding P101 (27) to the output end of the co-axial frequency meter and remove P101 (27). 2. Remove the crystal. 3. Replace the old crystal with a new one. 4. Reinstall P101 (27).
No Microammeter indication in "TUNED", "UN-TUNED" position of "METER" switch	Movable arm of R101 (12, figure 9-2) not making contact or open.	1. Unsolder the connecting wires. 2. Remove the knob (3) and retaining nuts. 3. Remove the variable resistor (12). 4. Replace the variable resistor (12). 5. Reverse the removal procedure to install.

TABLE 6-1 (cont)

TROUBLE SHOOTING CHART

Trouble	*Probable Cause*	*Remedy*
	C101 (6, figure 9-2) shorted.	1. Unsolder C101 (6) from its insulating terminals. 2. Remove C101 (6). 3. Replace and solder into place.
	Defective cable	1. Remove the defective cable. 2. Replace with a new cable and screw the connectors into place.
	Defective connector	1. Unsolder the wire leading from the defective connector. 2. Unscrew the four machine screws holding the connector to the panel. 3. Remove the connector. 4. Replace and reverse removal procedure to reinstall.
	M101 (2, figure 9-2) burned out.	1. Unsolder the two connecting wires. 2. Remove the three screws holding the meter (2) to the panel (30).

TABLE 6-I (cont)

TROUBLE SHOOTING CHART

Trouble	*Probable Cause*	*Remedy*
		3. Withdraw the damaged meter (2) through the front panel (30). 4. Replace with a new meter and reverse the steps to install.
	Defective wiring	1. Replace the wire and solder into position.
No Microammeter indication in "UNTUNED" position of "METER" switch.	Crystal CR102 (14, figure 9-2) burned out.	1. Unscrew contact (14). 2. Withdraw the crystal (14). 3. Install a new crystal. 4. Reinstall contact (14).

SECTION VII
CALIBRATION

7-1. CALIBRATION.

7-2. No check on the reliability of the coaxial frequency meter is required. If the test set sustains sufficient damage or shock to impair reliability the damage or shock will require replacing the complete coaxial line and micrometer.

CAUTION

Do not remove the micrometer barrel or the center conductor. To remove either may destroy the calibration of the test set.

SECTION VIII
INTRODUCTION TO ILLUSTRATED PARTS BREAKDOWN

8-1. GENERAL.

8-2. This Illustrated Parts Breakdown lists, describes and illustrates the parts of the Wavemeter AN/USM-54, Part Number 671478, manufactured by the Sperry Gyroscope Company, Division of The Sperry Corporation, Great Neck, New York.

8-3. GROUP ASSEMBLY PARTS LIST.

8-4. Section II, Group Assembly Parts List, provides the diametric view drawings and the part lists for each of the assemblies. The parts are grouped by assembly and subassembly. A system of indentation is used

throughout the parts lists to show the relationship of the detail part to the subassemblies and the relationship of the subassemblies to the major or main assemblies.

8-5. The parts lists are presented in a tabular form and contain the following information. Figure and Index Number - Provides the cross reference required between the lists and the illustrations. Part Number - Represents the part number of the original manufacturer, the AN Standard part number, or the JAN part number. Description - Represents the basic name of the part, plus any descriptive information or dimensions necessary to completely describe the part. Parts purchased from commercial sources show also a manufacturer's code symbol and the contractor's part number. This information is shown in parentheses after the Description. Units Per Assy - Indicate the quantity of a particular part necessary to assemble a subassembly or assembly. Usable on Code - This column provides a means of coding to indicate part application between similar units where the majority of the parts are the same. In instances where this similarity permits combining lists, this code indicates the parts peculiar to a specific assembly and those parts which are common to all of the assemblies combined.

8-6. The expression "Ref" is used in Units Per Assy column to indicate parts that have had their quantity shown in a higher assembly.

8-7. NUMBERING SYSTEM.

8-8. Basically the Sperry part, drawing and specification numbers are Arabic numbers of two or more digits. When a drawing covers several similar parts the drawing number is suffixed by a dash number for each part. The drawing number together with the dash number makes up the part number. No coding is included in the numbering system, thus it is impossible to determine the nature of the part from the part number unless reference is made to the Numerical Index and the Group Assembly Parts List in the manner described in paragraph 8-20.

8-9. Parts to which no number has been assigned but which may be purchased on the open market are identified by the word "Coml", shown in the part number column. When ordering these parts the complete description must be given.

8-10. SYMBOL USED IN THIS CATALOG.

8-11. The symbol used in this catalog and its meaning is as follows:

* = non-procurable parts

8-12. VENDORS CODE.

8-13. Parts which are available from sources other than the Sperry Gyroscope Company are listed under their manufacturer's part number. The identifying symbol of the manufacturer is listed after the description. A List of Manufacturers showing the identifying symbol and the Name and Address is listed on Page 18.

8-14. NUMERICAL INDEX.

8-15. Section III, Numerical Index lists all the part numbers appearing in the part number column of the Group Assembly Parts List.

8-16. For Government Standard Parts or Contractor Standard Hardware Parts, the figure and index number shown in the Numerical Index is the figure and index number of the first occurrence of such a part in the Group Assembly Parts List.

8-17. For Air Force Stock Numbers not contained in this Illustrated Parts Breakdown, reference should be made to the Master Numerical Index Publication Number S-00-1.

8-18. REFERENCE DESIGNATION INDEX.

8-19. Section IV, Reference Designation Index is provided to enable rapid cross referencing between the wiring schematics, which are shown in the applicable Handbook of Overhaul Instructions and diametric view drawings, which are shown in the Group Assembly Parts List. The Reference Designations are arranged in alphabetical and numerical order.

8-20. LOCATIONS OF PARTS IN CATALOG.

8-21. The location of parts when the part number is known is a relatively simple matter if the following steps are observed.

a. Locate the part number in the Numerical Index.

b. Note the figure and index number shown opposite the part number.

c. Locate the figure and index number in the Group Assembly Parts List.

d. Opposite the figure and index number is shown the part number and name.

8-22. The location of a part when the part number is not known is a slightly more difficult matter, but if the following steps are observed it should not be too difficult.

a. Refer to the applicable assembly breakdown.

b. Compare the part with the illustration until part is located.

c. Note the index number.

d. Locate the index number in the corresponding Group Assembly Parts List.

e. Opposite the index number is shown the part number and name.

f. If there are several similar parts on an illustration, reference should be made to all of them and the dimensions used to determine the part desired.

8-23. The location of a part when the reference designation is known is a relatively simple matter if the following steps are observed.

a. Locate the reference designation in the Reference Designation Index.

b. Note the figure and index number shown opposite it.

c. Locate the figure and index number in the Group Assembly Parts List.

d. Opposite the Index Number is shown the part number and name.

LIST OF MANUFACTURERS

Symbol	Name and Address	Symbol	Name and Address
ALP	Alden Products Co. Brockton, Massachusetts	LUNN	Lunn Laminates Inc. Port Washington, New York
AXS	Allmetal Screw Products Co. Inc. New York, New York	MLL	James Millen Mfg. Co., Inc. Malden, Massachusetts
CAF	Canfield Rubber Co. Bridgeport, Connecticut	NBTC	National Band and Tag Co. Newport, Kentucky
CRB	P. and F. Corbin Division of American Hardware Corp. New Britain, Connecticut	NIHA	Nielsen Hardware Corp. Hartford, Connecticut
DHM	Harry Davies Molding Co. Chicago, Illinois	PAFA	Arthur I. Platt and Co. Fairfield, Connecticut
DZ	Dzus Fastener Co., Inc. Babylon, New York	PIC	Penberthy Injector Co. Detroit, Michigan
EACG	Elcon Mfg. Co. Brooklyn, New York	RMS	Ramsey Corp. St. Louis, Missouri
GOS	Goshen Rubber Co., Inc. Goshen, Indiana	SH	Shakeproof Inc. Division of Illinois Tool Works Chicago, Illinois
IPC	Industrial Products Co. Division of Knudsen Inc. Danbury, Connecticut	STA	The Stanley Works New Britain, Connecticut
KK	Kurz-Kasch Inc. Dayton, Ohio	ZE	Zierick Mfg. Corp. New Rochelle, New York

SECTION IX
GROUP ASSEMBLY PARTS LIST

Figure and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy	Usable On Code
		WAVEMETER AN/USM-54		
1-	671478	WAVEMETER AN/USM-54	1	All
-1	871995	STRAP.	1	
		(ATTACHING PARTS)		
	Coml	. NUT, Cap, CRES .138 in.-32	2	
	Coml	. WASHER, External tooth lock, for .138 in. screw (SH)(Sperry Part No. 824636-3). .	2	
	Coml	. SCREW, Binding hd, CRES .138-32 x 3/16 in. (AXS)(Sperry Part No. 0453-218)	2	
1-	872005	. CABLE ASSY	1	
-2	ANUG536/U	. . CONNECTOR, Male contacts (Sperry Part No. 820915).	1	
-3	872137-1	. . MARKER, Wire (special requirements on NBTC style No. 1620)	1	
-4	ANUG89/U	. . JACK (Sperry Part No. 813849)	1	
-5	AN3199-2	. STUD, Snap slide (Sperry Part No. 287066). . .	2	
		(ATTACHING PARTS)		
	0425-014	. NUT, HEX, CRES .164 in.-32	2	
	AN935-8	. WASHER, Med spring lock, for .164 in. screw	2	
1-	609575	. COVER ASSY	1	
		(ATTACHING PARTS)		
	AN340C3	. NUT, Hex, CRES .099 in.-48	5	
	Coml	. WASHER, External tooth lock, for .099 in. screw (SH)(Sperry Part No. 824636-3). .	5	
	Coml	. SCREW, Binding hd, CRES .099-48 x 1/4 in. (AXS)(Sperry Part No. 0453-094)	5	All

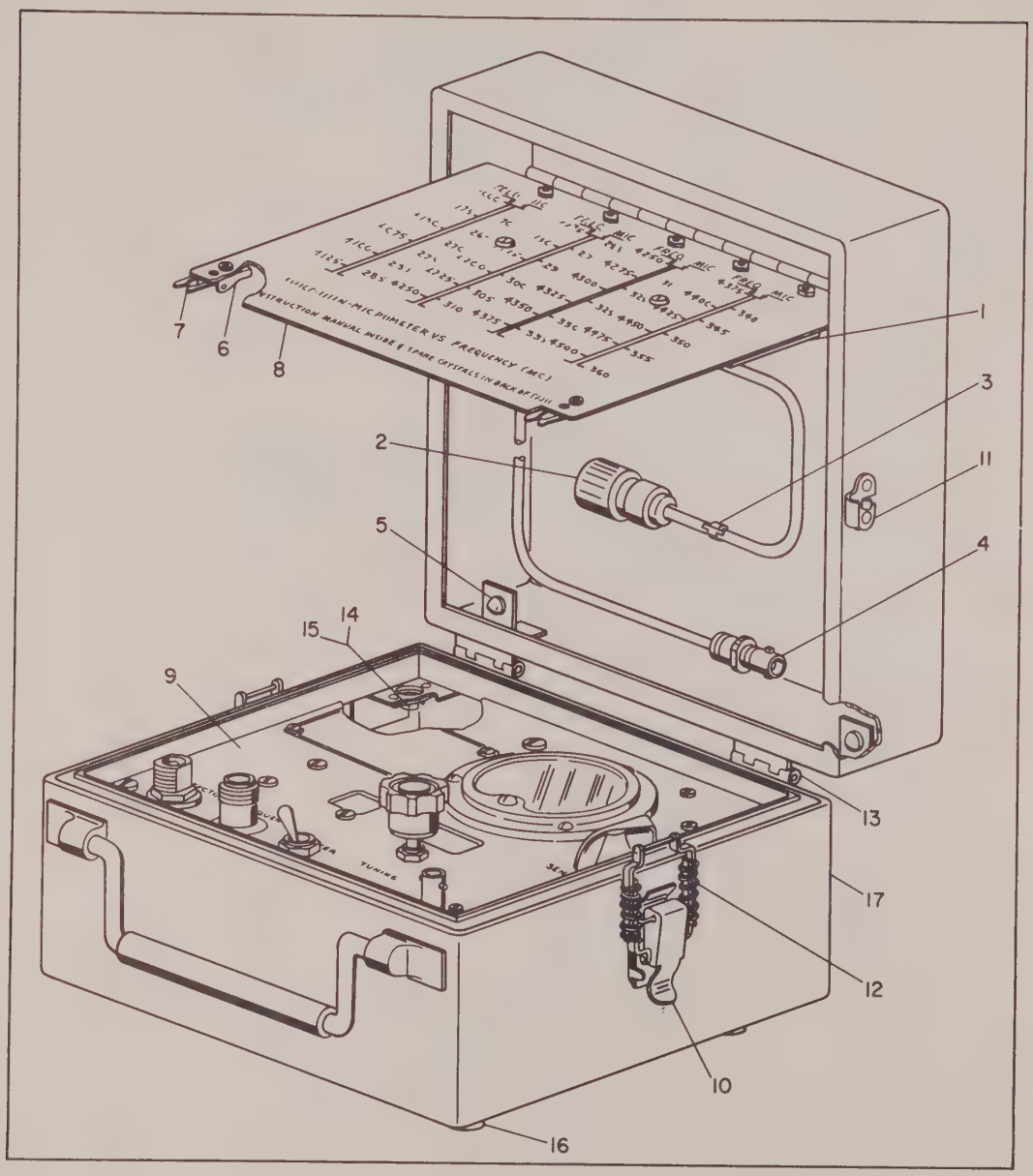


Figure 9-1. Wavemeter AN/USM-54

Figure and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy	Usable On Code
		WAVEMETER AN/USM-54 (cont)		
1-6	AN3195-21	. . GUIDE, Snapslide latch (Sperry Part No. 287067)	1	All
-7	AN3195-11	. . LATCH, snap slide (Sperry Part No. 287069)	1	
		(ATTACHING PARTS)		
	AN3195-31	. . RIVET, Snapslide (Sperry Part No. 287070)	1	
	AN3195-41	. . WASHER, Snapslide spring (Sperry Part No. 287068)	1	
		-------*-------		
-8	*No Number	. . COVER	NP	
-9	610694	. PANEL ASSY, Wavemeter (see fig. 2 for breakdown)	1	
1-	610641	. BOX ASSY	1	
-10	728278-1	. . CATCH, Draw pull (altered from NIHA Part No. SCD20648)	2	
-11	728278-2	. . STRIKE (altered from NIHA Part No. SCD20650-282)	2	
-12	728278-3	. . SPRING, Loop retainer (altered from NIHA Part No. SCB20651-2)	2	
-13	Coml	. . HINGE, Plain butt (STA Part No. 808).	2	
-14	RF3-1/2	. . RECEPTACLE (DZ) (Sperry Part No. 709728-076)	4	
-15	RF3-1/2-5	. . GROMMET (DZ) (Sperry Part No. 709728-077)	4	
-16	5674	. . BUMPER, Rubber (CAF) (Sperry Part No. 283329)	4	
-17	*No Number	. . BOX	NP	All

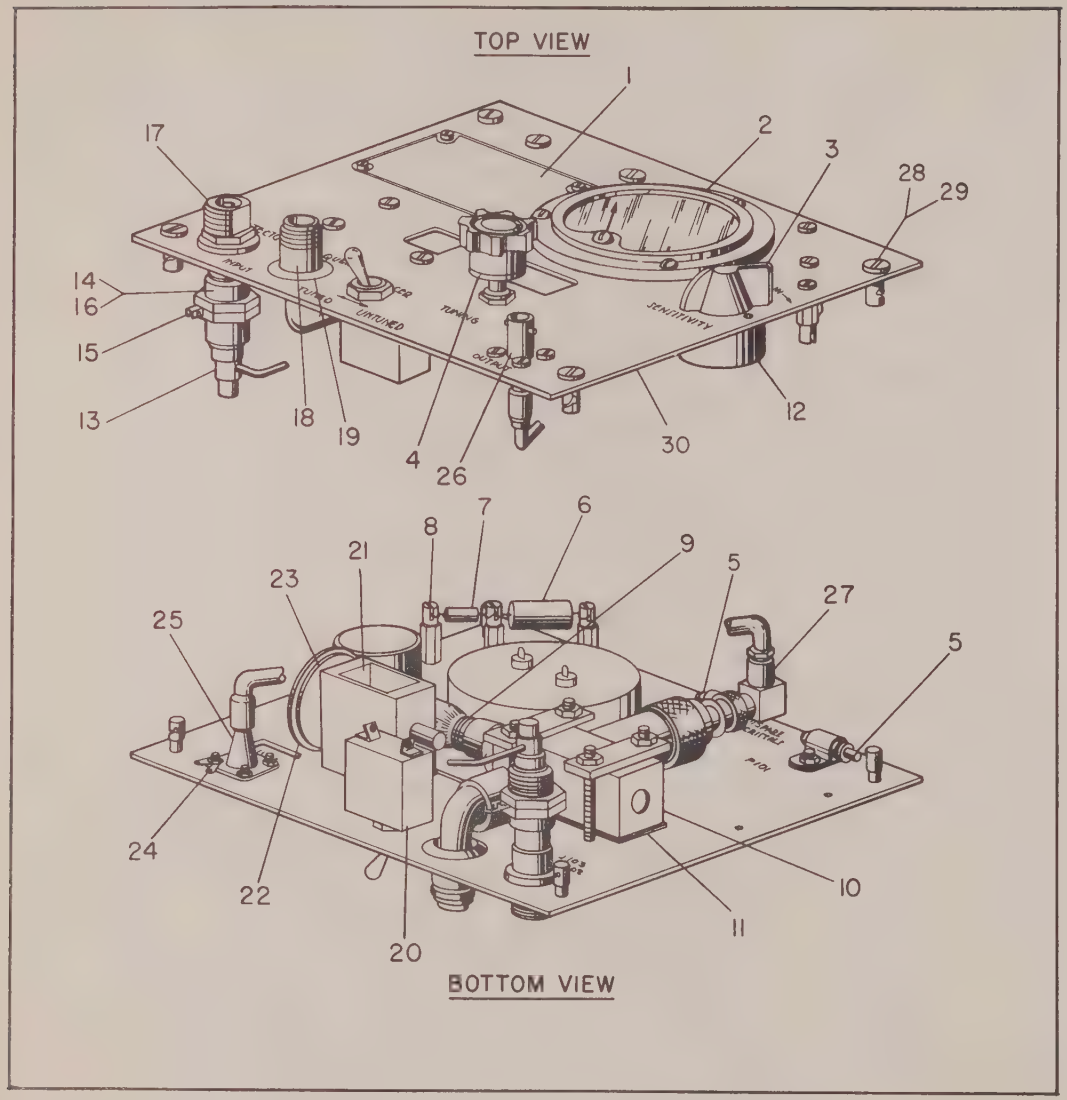


Figure 9-2. Wavemeter Panel Assembly

Figure and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy	Usable On Code
		WAVEMETER PANEL ASSEMBLY		
2-	610694	PANEL ASSY, Wavemeter (see fig. 1-9 for next higher assy)	Ref	All
-1	741595	. PLATE, Name	1	
		(ATTACHING PARTS)		
	Coml	. SCREW, Binding hd, CRES .099-48 x 1/4 in. (AXS) (Sperry Part No. 0453-094)	4	
	Coml	. WASHER, Internal tooth lock for .099 in. screw (SH)(Sperry Part No. 824637-2) . .	4	
		-------*-------		
-2	MILMR36W050DCUAR	. AMMETER, DC, range 0-50 (Sperry Part No. 720691-03)	1	
-3	S292-3L	. KNOB, Pointer (KK)(Sperry Part No. 212188)	1	
-4	4100B	. KNOB, Knurled (DHM)(Sperry Part No. 242448)	1	
-5	MIL1N21B	. RECTIFIER, Crystal (Sperry Part No. 824138-1)	2	
		(ATTACHING PARTS)		
2-	AN340C8	. NUT, Hex, CRES .164 in.-32	2	
	Coml	. WASHER, Internal tooth lock, for .164 in. screw (SH)(Sperry Part No. 824637-6) . .	2	
	714595-272	. SCREW, Binding hd, CRES .164-32 x 5/16 in. . .	2	
	28	. CLIP, Tool (PAFA)(Sperry Part No. 307422)	2	
		-------*-------		
-6	CM35B103J	. CAPACITOR, Fixed mica dielectric, 10,000 uuf ±5%, 300 vdc working (Sperry Part No. 0161-28)	1	
-7	RC20BF241J	. RESISTOR, Fixed molded composition, 240 ohms ±5%, 1/2w (Sperry Part No. 069-34) . . .	1	
-8	BT19	. TERMINAL, Standoff (EACG) (Sperry Part No. 285492)	3	All

Figure and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy	Usable On Code
		WAVEMETER PANEL ASSEMBLY (cont)		
		(ATTACHING PARTS)		
2-	714595-126	. SCREW, Binding hd, CRES .112-40 x 1/4 in. . . .	3	All
	AN936A4B	. WASHER, Internal tooth lock, for .112 in. screw	3	
		-------*-------		
-9	RST56S	. RING, External retaining (RMS)(Sperry Part No. 0532-24)	1	
-10	671912	. METER ASSY, Frequency	1	
		(ATTACHING PARTS)		
	AN340C8	. NUT, Hex, CRES .164 in.-32	4	
	Coml	. WASHER, Internal tooth lock, for .164 in. screw (SH)(Sperry Part No. 824637-6) . .	4	
	714595-285	. SCREW, Binding hd, CRES .164-32 x 1-1/2 in. . .	4	
	328466	. CLAMP, Meter assembly	2	
		-------*-------		
-11	836588	. COVER, Window	1	
		(ATTACHING PARTS)		
	309638	. CLAMP, Washer	1	
	Coml	. WASHER, Internal tooth lock, for .138 in. screw (SH)(Sperry Part No. 824637-5) . .	1	
	714595-220	. SCREW, Binding hd, CRES .138-32 x 1/4 in.	1	
		-------*-------		
-12	RA20A1FD103AK	. RESISTOR, Variable wire wound, 10,000 ohms ±10%, 2w (Sperry Part No. 0193-144) . .	1	
-13	240360	. CAP,tube (special requirements on ALP Part No. 90SL)	1	
-14	308136	. CONTACT	1	
-15	47	. TERMINAL, Soldering (ZE)(Sperry Part No. 308821)	1	All

Figure and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy	Usable On Code
		WAVEMETER PANEL ASSEMBLY (cont)		
2-16	MIL1N21B	. RECTIFIER, Crystal (Sperry Part No. 824138-1)	1	All
-17	12500	. HOLDER, Crystal (IPC)(Sperry Part No. 735464)	1	
-18	ANUG27B/U	. ADAPTER, Right angle (Sperry Part No. 812980)	1	
-19	AN931-9-13	. GROMMET, Elastic (GOS)(Sperry Part No. 0128-23)	1	
-20	JANST42D	. SWITCH, Toggle (Sperry Part No. 0232-4)	1	
-21	10012	. DRIVE, Right angle (MLL)(Sperry Part No. 713719)	1	
		(ATTACHING PARTS)		
	714595-222	. SCREW, Binding hd, CRES .138-32 x 5/16 in. . . .	2	
	Coml	. WASHER, Internal tooth lock, for .138 in. screw (SH)(Sperry Part No. 824637-5) . .	2	
		-------*-------		
-22	AN6227-21	. PACKING, Hydraulic (Sperry Part No. 0184-21)	1	
-23	328465	. WHEEL	1	
		(ATTACHING PARTS)		
	Coml	. SCREW, Plain point hex socket set, CRES .138-32 NC-3 x 3/16 in. (PIC) (Sperry Part No. 0454-224)	2	
		-------*-------		
-24	11A	. LUG, Terminal (ZE)(Sperry Part No. 130854)	2	
-	713658	. CABLE ASSY	1	
		(ATTACHING PARTS)		
	AN935-3	. WASHER, Med spring lock, for .099 in. screw	4	
		-------*-------		
-25	ANMX195/U	. . HOOD (Sperry Part No. 812337)	1	All

Figure and Index No.	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy	Usable On Code
		WAVEMETER PANEL ASSEMBLY (cont)		
		(ATTACHING PARTS)		
2-	AN340C3	. . NUT, Hex, CRES .099 in.-56	4	All
	714595-114	. . SCREW, Binding hd, CRES .099-56 x 3/8 in. .	3	
	714595-115	. . SCREW, Binding hd, CRES .099-56 x 7/16 in. .	1	
		-------*-------		
-26	ANUG290/U	. . RECEPTACLE (Sperry Part No. 813848)	1	
-27	8525	. . PLUG, Right angle (IPC)(Sperry Part No. 827600)	1	
-28	A3-1/2T16	. FASTENER (DZ)(Sperry Part No. 709728-016) . . .	4	
-29	GH3-1/2	. GROMMET (DZ)(Sperry Part No. 709728-075) . . .	4	
-30	609611	. PANEL	1	All

SECTION X
NUMERICAL INDEX

Class Code or Stock No.	Part Number	Source Code	Fig. & Index No.	Qty. Per Article
	Box		1-17	NP
	Cover		1-8	NP
	Hinge		1-13	2
	Nut .138-32		1	2
	Screw .099-48 x 1/4		1	9
R43S/240496-6	Screw .138-32 x 3/16		1	2
	Screw .138-32 x 3/16		2	2
R43W96500	Washer .099		1	5
R43W96905-15	Washer .099		2	4
R43W96500	Washer .138		1	2
R43W9605-25	Washer .138		2	3

Class Code or Stock No.	Part Number	Source Code	Fig. & Index No.	Qty. Per Article
	Washer .164		2	6
R16H7894	ANMX195/U		2-25	1
	ANUG27B/U		2-18	1
	ANUG290/U		2-26	1
R16R2435	ANUG536/U		1-2	1
	ANUG89/U		1-4	1
	AN3195-11		1-7	1
	AN3195-21		1-6	1
	AN3195-31		1	1
	AN3195-41		1	1
	AN3199-2		1-5	2
	AN340C8		2	6
	AN340C3		1	4
	AN6227-21		2-22	1
	AN931-9-13		2-19	1
	AN935-3		2	4
	AN935-8		1	2
	AN936A4B		2	3
	A3-1/2T16		2-28	4
R17T4947	BT19		2-8	3
	CM35B103J		2-6	1
R42F26840	GH3-1/2		2-29	4
R17S28246-40	JANST42D		2-20	1
	MIL1N21B		2-5	3
	MILMR36W050DCUAR		2-2	1
	RA20A1FD103AK		2-12	1
	RC20BF241J		2-7	1
R42F24023-900	RF3-1/2		1-14	4
R42F26915	RF3-1/2-5		1-15	4
	RST56S		2-9	1
R16K4073	S292-36		2-3	1
	0425-014		1	2
	10012		2-21	1
	11A		2-24	2
	12500		2-17	1

Class Code or Stock No.	Part Number	Source Code	Fig. & Index No.	Qty. Per Article
	240360		2-13	1
	28		2	
	308136		2-14	1
	309638		2	1
	328465		2-23	1
	328466		2	2
R16-K-3347	4100B		2-4	1
	47		2-15	1
	5674		1-16	4
	609575		1	1
	609611		2-30	1
	610641		1	1
	610694		1-9	1
	671478		1	1
	671912		2-10	1
	713658		2	1
	714595-114		2	3
	714595-115		2	1
	714595-126		2	3
	714595-220		2	1
	714595-222		2	2
	714595-272		2	2
	714595-285		2	4
	728278-1		1-10	2
	728278-2		1-11	2
	728278-3		1-12	2
	741595		2-1	1
	836588		2-11	1
	8525		2-27	1
	871995		1-1	1
	872005		1	1
	872137-1		1-3	1

SECTION XI
REFERENCE DESIGNATION INDEX

Reference Designation	Fig. & Index No.	Class Code or Stock Number	Part Number
C-101	2-6		CM35B103J
CR-102	2-16		MIL1N21B
J-102	2-18		ANUG27B/U
J-103	2-17		12500
M-101	2-2		MILMR36W050DCUAR
P-101	2-27		8525
R-101	2-12		RA20A1FD103AK
R-102	2-7		RC20BF241J
S-101	2-20	R17S28246-40	JANST42D
Z-101	2-10		671912

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